

COMPARATIVE DATA OF THE NUTRITION OF GREBES (PODICIPIDAE) AT THE TISZA

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Abstract

The paper is investigating the nutrition of the grebe species (*Podiceps cristatus*, *Podiceps ruficollis*, *P. nigricollis*, *P. griseigena*) collected in the environment of the Tisza, with a comparative method. The material placed at our disposal for being compared was collected at the delta and the Hungarian reaches of the Danube, at fish-ponds and other natural or „cultivated” waters. There were investigated together 113 gastric contents. The results have proved a general dominance of insect foodstuffs. The maximum size of the gastric fish remains was 10 cm at the great crested grebe, 8 cm at the red-necked grebe. In case of the black-necked grebe and the small grebe there couldn't be found any fish foodstuff. At the Tisza, all the three species — except the black-necked grebe — fed on the grubs of the *Palingenia longicauda* that meant a local speciality.

Introduction

About the nutrition of the European grebe species a comprehensive knowledge can be found in the literary summary of NIETHAMMER—BAUER—GLUTZ's Manual (1966). From Hungarian territory, however, there have not been published, so far, any Podiceps-bromatologic investigations. The gastric-content material of the Hungarian Ornithological Institute and BOTOND J. KISS's collection from the delta of the Danube have now rendered possible for us to evaluate the food composition of the grebe species originating from the Tisza (Szeged—Hódmezővásárhely), comparing them with those collected from the Danube, fish-ponds, and other waters. This method, in addition to determining the different foodstuffs, may also give answer to the problem if the environment of the Tisza promises, in case of grebes, any bromatologic peculiarities.

Materials and Methods

The gastric-contents were investigated prepared dry, with a binocular microscope. It appeared from their elaboration that the exaggerated separation of the collecting stations hasn't much practical importance. The Tables were, therefore, made according to the categories Tisza, Danube, the delta of Danube, fish-ponds, as well as other waters. The foodstuffs proved were classified according so the frequency of their occurrence.

Results

1. Freat crested grebe — *Podiceps cristatus* (L.) 1758.

78 individuals of these were investigated, 23 of them originating from the Tisza, 25 from the delta of the Danube, 6 from the Hungarian Danube reaches, 21 from fish-ponds, and 3 from other waters. The data of the collections are as follows:

Tisza: Mártély 20 March 1970; 30 March; 30 March; 30 March; 1 April; 2 April; 2 April; 5 April; 20 April; 20 May; 31 March 1972; Körtvélyes, 20 March 1970; 30 March; 1 April; 1 April 1971; 10 April; 10 May; Holm Atka, 10 March 1970; 10 March; 20 March; 10 April 1971; 19 April; meadow at Barc, 5 April 1970.

The distribution of the gastric-content foodstuffs of the 23 individuals collected from the Tisza is as follows:

Kind of foodstuff	Cases of occurrence	Piece
Chitin-remains	10	fragments
Fish-bone	7	fragments
Frog-bone	3	fragments
Grub of <i>Palingenia longicauda</i>	2	2
<i>Alburnus alburnus</i>	1	1
<i>Aspro zingel</i>	1	1
<i>Cyprinidae</i> sp.	1	1
Bone and hair of small mammals	1	fragments
Grub of <i>Odonata</i> sp.	1	fragments
<i>Dytiscus marginalis</i>	1	1
<i>Ochthebius</i> sp.	1	1
<i>Hydrophilidae</i> sp.	1	fragments
Grub of <i>Chironomus</i> sp.	1	1

The material investigated, originating from the delta of the Danube: Chilia, 18 March 1969; 30 March; 30 March; St. Gheorge, 18 February 1968; 21 February; 5 January 1969; 5 February; 5 February; 5 February; Cănal Crasnicol, 12 February 1968; Tulcea, 29 March 1969; 29 March; 29 March; 30 March; Mineri, 30 March 1969; 31 March; 16 April; 17 April; 17 April; 1 May; Murighiol, 14 April 1970; 14 April; Letea, 28 March 1968; Jurilovca, 19 March 1969; delta of the Danube, without date, from Hungary: Szigetszentmiklós, 18 June 1950; 18 July; 1 August; Magyar-óvár, 5 July 1960; Ásvány, 1 July 1962; Majosháza, 21 September 1947.

Sorts of foodstuffs from the gastric-content of 31 individuals from the Danube, resp. the delta of the Danube:

Kind of foodstuff	Cases of occurrence	Piece
Fish-bone	9	fragments
Chitin-remains	8	fragments
<i>Cyprinidae</i> sp.	5	5
Hair and bone of small mammals	4	fragments
<i>Alburnus alburnus</i>	3	3
<i>Dytiscus marginalis</i>	2	2
<i>Hydrophilidae</i> sp.	2	2
<i>Helophorus</i> sp.	2	2
<i>Carassius vulgaris</i>	1	1
<i>Rutilus rutilus</i>	1	1
Frog-bone	1	fragments
<i>Berosus</i> sp.	1	1
Reed-grass remains	1	fragments

Collections at fish-ponds: Szeged-Fehértó, 25 March 1963; Biharugra, 6 May 1957; 12 April 1958; 24 July; Hortobágy, 11 May 1947; 11 May; 8 August 1950; 14 August; 1 September; Rét-

szilas, 1 April 1948; 18 April; 18 April; 18 April; 3 August 1951; 3 July 1952; 25 April 1954; 15 June 1955; 10 May 1957; Varásló, 5 July 1955; Dombóvár, May 1955; Mórchely, 11 April 1954.
Gastric-content of 21 individuals from fish-ponds:

Kinds of foodstuff	Cases of occurrence	Piece
Chitin-remains	14	fragments
Fish-bone	3	fragments
<i>Cyprinus carpio</i>	2	2
Grub of <i>Odonata</i> sp.	2	2
<i>Helophorus</i> sp.	1	2
<i>Rhodeus s. amarus</i>	1	1
Seeds of <i>Zea mays</i>	1	fragments

Other water collections: Rice-field canals at Mezótúr, 5 April 1965; Lake Velence at Dinnyés, 16 March 1947; Albertirsa, 24 October 1952.

The foodstuffs found in three stomachs are:

Kinds of foodstuff	Cases of occurrence	Piece
Chitin-remains	3	fragments
<i>Berosus</i> sp.	1	1
Hair and bone of small mammals	1	fragments

2. Small grebe — *Podiceps ruficollis* (PALL.) 1764.

There were investigated 14 individuals, 5 of these are from the Tisza, 2 from the Hungarian Danube, 4 from fish-ponds, 3 from other waters.

Tisza: Szeged, 1 June 1952; Holm Atka, 1 August 1970; meadow at Barc, 2 November 1969; Körtvélyes, 10 April 1970; Mártély, 1 October 1970.

The gastric-contents of the 5 individuals from the Tisza are:

Kinds of foodstuff	Cases of occurrence	Piece
Grub of <i>Palingenia longicauda</i>	3	detritic mass
<i>Helophorus</i> sp.	2	3
Chitin-remains	2	detritic mass
Seeds of <i>Polygonum</i> sp.	2	160
<i>Ochthebius</i> sp.	1	1
<i>Berosus</i> sp.	1	1
Grub of <i>Odonata</i> sp.	1	fragments

Collections from the Danube: Baja, 21 October 1954; Gyimrót, 12 September 1961.

In two gastric-contents from the Danube we found, on one occasion each, some chitin in fragmentary state and remains of *Sigara* sp. and *Hydrophilidae* sp.

Collections from fish-ponds: Szeged—Fehértó, 1 November 1965; Biharugra, 27 July 1958; Varásló, 25 March 1953; 29 July.

The foodstuffs proved from four stomachs are:

Kinds of foodstuff	Cases of occurrence	Piece
Chitin-remains	3	fragment
<i>Hydrophilidae</i> sp.	2	7
<i>Ochthebius</i> sp.	1	6
<i>Hydraena</i> sp.	1	1
<i>Spercherus</i> sp.	1	3
Seed of <i>Carex</i> sp.	1	1
Seed of <i>Polygonum</i>	1	1

Material from other water-sides: Dorog, 18 September 1958; Békéscsaba, 14 April 1952; Pálósszentkút, 31 August 1952.

Food distribution of the three gastric-contents:

Kinds of foodstuff	Cases of occurrence	Piece
Chitin-remains	2	fragments
Grubs of <i>Odonata</i> sp.	1	6

3. Black-necked grebe — *Podiceps nigricollis* (CH. L.) BREHM 1831.

There were 13 gastric-contents at our disposal: from the Tisza 4, from the Hungarian Danube 1, from the fish-ponds 5, from other waters 3.

Data about the Tisza: Mártély, 2 May 1970; 2 May; 1 July; 31 March 1971.

Gastric contents of the four individuals from the Tisza:

Kinds of foodstuff	Cases of occurrence	Piece
<i>Sigara</i> sp.	2	7
Grubs of <i>Chironomus</i> sp.	1	128
<i>Hydrophilidae</i> sp.	1	fragments
Chitin-remains	1	fragments
Bone and hair of small mammals	1	fragments

We have found in the gastro-intestinal organs of the single individual, originating from the Danube, shot on 13 May 1951 in Gyimrót, a large mass of *Chara* spores and two exemplars of *Planorbis spirorbis*.

Collections from the fish-ponds: Biharugra, 17 July 1951; 25 April 1960; 12 June 1966; 27 April 1967; Varászló, 19 September 1954.

Contents of the five stomachs:

Kinds of foodstuff	Cases of occurrence	Piece
Chitin-remains	3	fragments
Grub of <i>Odonata</i> sp.	1	1
<i>Spercherus</i> sp.	1	1
<i>Hydrobius</i> sp.	1	fragments
<i>Hydrophilidae</i> sp.	1	fragments
<i>Helophorus</i> -sp.	1	3
<i>Chara</i> spore	1	large amount

Collections originating from other waters: Lake Velence, Dinnyés, 24 March 1947; Békéscsaba, 16 April 1967; Pálósszentkút, 31 March 1951.

Contents of the three stomachs:

Kinds of foodstuff	Cases of occurrence	Piece
Grubs of <i>Chironomus</i> sp.	1	126
<i>Enochrous bicolor</i>	1	1
Chitin-remains	1	fragments
Frog-bone	1	fragments
<i>Chara</i> -spore	1	large amount

4. Red-necked grebe — *Podiceps griseigena* BÖDD. 1783.

There were investigated eight individuals of this comparatively rarer species: 2 of them originating from the Tisza, 1 from the delta of the Danube, 1 from the Hungarian Danube, 3 from fish-ponds, 1 from other waters.

Data of the individuals originating from the Tisza are: Körtvélyes, 2 June 1969; Holm of Atka, 5 July 1970.

Contents of the two stomachs:

Kinds of foodstuff	Cases of occurrence	Piece
Grub of <i>Palingenia longicauda</i>	1	fragments
<i>Dytiscus marginalis</i>	1	fragments
Frog-bone	1	fragments

Collection of an individual from the delta of the Danube: Chilia, 19 March 1963; another individual from the Hungarian Danube-region: Szigetcsép, August 1965.

The nutriment found in the individuals originating from the Danube:

Kinds of foodstuff	Cases of occurrence	Piece
Chitin-remains	2	plenty of fragments
Grubs of <i>Chironomus</i> sp.	1	4
<i>Halipus</i> sp.	1	2
<i>Hidrous piceus</i>	1	1

Individuals from the fish-ponds: Hortobágy, 7 August 1950; 17 August; Biharugra, 29 August 1958.

Gastric-contents of the three individuals from the fish-ponds:

Kinds of foodstuff	Cases of occurrence	Piece
Frog-bone	2	fragments
Reed-grass	1	fragments
<i>Chara</i> -spore	1	in mass
<i>Cyprinidae</i> sp.	1	2
<i>Hydrophilidae</i> sp.	1	2

Our single individual from other waters is originating from the Dinnyés region of the Lake Velence. Date of collection: 23 September 1946. Gastric-content: the remains of 1 *Cyprinidae* sp., embedded in feathers.

Summary

The evaluation of the investigation is rendered more difficult by the fact that the remains of foodstuffs were found in an extremely fragmentary state. Another difficulty was raised in every case of the great crested and red-necked grebes, in five cases of the small grebes and in two cases of the black-necked grebes by the large mass of feathers that is a well-known characteristic of grebe stomachs. An exact determination of the fish-bones and insect remains ground to dust and embedded in feather balls was, therefore, mostly possible only in rough outlines.

All the four species are characterized by the general dominance of the insect foodstuff. In case of the small and black-necked species we have not found any fish.

Taking into consideration that about 30 per cent of our full material investigated came from the neighbourhood of fish-ponds, this notice may be reassuring even for practical fish-breeders. Fish-remains found in measurable state in case of freat crested grebes are: *Cyprinidae* sp. 6—7—8—8—10 cm. *Alburnus* sp. 5—8—8 cm. *Aspro zingel* 7 cm. *Rhodeus s. amarus* 3 cm. In case of the red-necked crebe: *Cyprinidae* sp. 5—5—8 cm.

At the investigated material from the Tisza, we are emphasizing, as a speciality, the repeated occurrence of the grubs of *Palingenia longicauda*. We have proved the presence of the grub of the Ephemera at 23 freat crested grebes on two occasion, at five small greves in three cases and in large numbers, at two red-necked grebes in one case, similarly in large numbers. The four black-necked grebes avoided this sort of foodstuffs.

References

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